

--31. A ceramic heater according to claim 29, wherein said heat generation pattern comprises spiral wire bodies.--

--32. A ceramic heater according to claim 29, wherein an amount of offset displacement between mutually adjacent portions in said heat generation patterns is in a range of 1 to 100 μm .--

--33. A ceramic heater according to claim 29, wherein said maximum amount of offset displacement is in a range of 3 to 500 μm .--

--34. A ceramic heater according to claim 29, wherein said maximum amount of offset displacement is in a range of 40 to 500 μm .--

--35. A ceramic heater according to claim 29, wherein said ceramic substrate is made of a nitride ceramic or a carbide ceramic.--

--36. A ceramic heater according to claim 29, wherein said ceramic substrate has an anti-thermal shock property ΔT of 190 to 200°C.--

--37. A ceramic heater according to claim 29, wherein said heat generation pattern is flat at a cross-section in the thickness direction of said ceramic substrate and has a thickness of 5 to 50 μm .--

--38. A ceramic heater according to claim 29, wherein said heat generation pattern comprises spiral wire bodies each having a thickness of 0.1 to 2 mm.--

--39. A ceramic heater according to claim 29, wherein said heat generation pattern comprises spiral wire bodies each having a width of 1 to 10 mm.--

--40. A ceramic heater according to claim 29, wherein said heat generation pattern comprises spiral wire bodies each having an aspect ratio (width/thickness) of 1 to 10.--

REMARKS

Claims 29-40 are pending. By this Amendment, claims 11-28 are canceled. New claims 29-40 replace claims 11-28. Figures 1-3, 5, 7-11 and 13 are amended with proper

cross-sectional hatching to denote refractory materials, as requested by the Examiner. The specification is amended to correct translations of Japanese language PCT Application No. WO 01/39551. No new matter is added. Reconsideration of the application is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)).

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance (for the reasons discussed herein); (b) do not raise any new issue requiring further search and/or consideration (since the amendments amplify issues previously discussed throughout prosecution); and (c) place the application in better form for appeal, should an appeal be necessary. Entry of the amendments is thus respectfully requested.

I. The Drawings

The Office Action objects to the drawings. Figures 1-3, 5, 7-11 and 13 are amended with proper cross-sectional hatching to denote refractory materials, as requested by the Examiner. Accordingly, withdrawal of the objection to the drawings is respectfully solicited.

II. The Rejection over the Combination of Kawanabe, Jordan, Lowell et al., Lowell, Sato, Lytle and Wright

The Office Action rejects claims 11-13, 27 and 28 under 35 U.S.C. §103(a) over U.S. Patent 6,133,557 to Kawanabe et al. in view of either U.S. Patent 1,998,764 to Jordan et al., U.S. Patent 4,384,192 to Lowell et al., U.S. Patent 4,233,497 to Lowell, U.S. Patent 5,344,492 to Sato et al., U.S. Patent 2,724,658 to Lytle, or U.S. Patent 3,336,558 to Wright. This rejection is moot with respect to the canceled claims 11-28 and respectfully traversed with respect to claims 29-40, if applicable.

The Office Action admits that Kawanabe does not disclose or suggest offsetting at least part of the heat generation pattern on a level different from that of others of the pattern in the substrate thickness direction. However, the Office Action asserts that Jordan, Lowell et al., Lowell, Sato, Lytle and Wright disclose a single resistor that produces heating gradient or resistance gradient. Therefore, the Office Action asserts that it would have been obvious to one skilled in the art to substitute Kawanabe's multiple resistor configuration with the single resistor of Jordan, Lowell et al., Lowell, Sato, Lytle and Wright. Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to combine Jordan, Lowell et al., Lowell, Sato, Lytle or Wright with Kawanabe.

First, for ease of discussion, the disclosures of Kawanabe, Jordan, Lowell et al., Lowell, Sato, Lytle and Wright are summarized below.

Kawanabe discloses a wafer holding member having two separate heating resistors 12 and 13. See Figs. 5 and 6; col. 10, line 62 - col. 11, line 2; and col. 12, lines 10-14. The heating resistors 12 and 13 are opened or closed (switched ON or OFF) to prevent overcurrent. See col. 11, lines 36-40 and col. 12, lines 14-27. An overcurrent appears when a constant voltage is applied to a resistor and the resistance value of the resistor decreases at room temperature. See col. 2, lines 47-54. Thus, Kawanabe discloses switching from one resistance at resistor 12 to another resistance at resistor 13 according to a predetermined temperature setting. See col. 12, lines 14-27.

Jordan discloses a cooker having a cooking plate a. See col. 1, lines 1-4. The heating body b resides below the cooking plate a. See Figs. 2 and 3, and col. 2, lines 24-34. The cooking plate a has a thickness that gradually increases from the outer circumferential portion to the center portion, to provide uniform heating. See Fig. 2 and col. 2, lines 31-34.

Lowell et al. discloses a cooker having a disk-shaped plane resistive conductor 21 with flat surface and a thickness that gradually increases from the outer circumferential

portion to the center portion, to provide uniform heating. See Figs. 1 and 3; col. 2, lines 43-49; col. 3, lines 30-33; and col. 6, lines 15-19. The plane resistive conductor 21 is not embedded in a ceramic substrate. See Fig. 3.

Lowell discloses a cooker having a disk-shaped plane heating element 10 with flat surface and a thickness that gradually increases from the outer circumferential portion to the center portion, to provide uniform heating. See Figs. 1 and 2; and col. 3, lines 6-15 and lines 52-55. The plane heating element 10 is not embedded in a ceramic substrate. See. Fig. 2.

Sato discloses a vapor growth apparatus having a disk-shaped heater 102 with a flat bottom surface and a thickness that gradually increases from the outer circumferential portion to the center portion, to provide uniform heating. See Figs. 8 (b) and 8(c); and col. 1, line 60 - col. 2, line 2. The heater 102 is housed in a receiver 11. See Fig. 7; and col. 1, lines 30-33. Therefore, the heater 102 is not embedded in a ceramic substrate.

Lytle discloses a resistor coating method in which the spray speed may be varied to obtain thickness variation of the resistor used in a bus bar. See Fig. 6; and col. 7, lines 36-42. Such a variation reduces the tendency to establish an unduly high current density at the end of the bus bar. See col. 2, lines 21-22. Lytle discloses that a conductive layer is coated on a glass sheet. See col. 2, lines 48-54. Thus, Lytle does not disclose embedding the conductive layer in a ceramic substrate.

Wright discloses a non-linear resistance element 14 having a flat surface and a non-linear thickness. See Fig. 2 and col. 4, lines 4-8. The non-linear thickness is to provide smooth, accurate resistance-per-unit-length slope changes which may vary greatly over the length of the element. See col. 2, lines 41-44.

II-A. No Motivation to Combine Jordan, Lowell et al. or Lowell with Kawanabe

Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to combine Jordan, Lowell et al. or Lowell with Kawanabe because Jordan,

Lowell et al. and Lowell are related to non-analogous arts from Kawanabe. As discussed above, Kawanabe is directed to semiconductors with a purpose of preventing overcurrent in a heater embedded in a substrate. In contrast, Jordan, Lowell et al. and Lowell are directed to food cookers with a purpose of providing uniform heating. The resistor of Lowell et al. and Lowell are not embedded in a substrate. Applicant respectfully submits that semiconductors and food cookers are not from the same field of endeavor, and overcurrent prevention and uniform heating provision are not the same purpose. Therefore, Kawanabe and Jordan, Lowell et al. and Lowell are non-analogous because they are related to neither the same field of endeavor, nor the same purpose. See In re Clay, 966 F.2d at 659, 23 USPQ2d at 1060-1061 (Fed. Cir. 1992).

Furthermore, Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to substitute Kawanabe's multiple resistor configuration with the single resistor of Jordan, Lowell et al. and Lowell, because such a substitute would render Kawanabe inoperative. As discussed above, Kawanabe discloses using two separate resistors of different resistances to prevent overcurrent. In contrast, Jordan, Lowell et al. and Lowell disclose a one-piece resistor without any disclosed variation in resistance. Thus, while substituting Kawanabe's multiple resistors with a one-piece resistor may obtain uniform heating to the disk-shaped heating plate of Jordan, Lowell et al. and Lowell, such a substitute would provide no control of resistance values based on preset temperature. Thus, such a substitute would render Kawanabe's overcurrent prevention inoperative. Therefore, one of ordinary skill in the art would not have been motivated to make such a substitute.

In addition, Applicant respectfully submits that the Office Action has failed to provide any motivation that the heating bodies of the cooker disclosed in Jordan, Lowell et al. and Lowell could be used in Kawanabe's wafer holding member. As is well established, "obviousness cannot be established by combining the teachings of the prior art to produce the

claimed invention, absent some teaching or suggestion supporting the combination...the mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992).

Thus, while the Office Action conjectures that the heating resistors of Kawanabe's wafer holding member and the heating bodies of the cooker disclosed in Jordan, Lowell et al. and Lowell may both function as heaters, such observation does not provide motivation that one of ordinary skill in the art would have applied the heating bodies of a cooker to a wafer holding member. Many practical parameters such as cracking, tension, thermal bending, etc. must be considered and results verified before one of ordinary skill in the art will ever be motivated to follow the Examiner's suggestions.

In view of the above, the Office Action is engaging in impermissible hindsight reconstruction using the present application as a roadmap. One of ordinary skill in the art simply would not be motivated to modify Kawanabe's wafer holding member based on the disclosure in Jordan, Lowell et al. and Lowell. Accordingly, the Office Action has not established a *prima facie* case of obviousness.

II-B. No Motivation to Combine Sato, Lytle or Wright with Kawanabe

Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to substitute Kawanabe's multiple resistor configuration with the single resistor of Sato, Lytle and Wright, because such a substitute would render Kawanabe inoperative. As discussed above, Kawanabe discloses using two separate resistors of different resistances to prevent overcurrent. In contrast, Sato, Lytle and Wright disclose a one-piece resistor, which is either connected to an apparatus or not connected to the apparatus. Thus, substituting Kawanabe's multiple resistors with the one-piece resistor would provide no control of resistance values based on preset temperature. Thus, such a substitute

would render Kawanabe's overcurrent prevention inoperative. Therefore, one of ordinary skill in the art would not have been motivated to make such a substitute.

In view of the above, the Office Action is engaging in impermissible hindsight reconstruction using the present application as a roadmap. One of ordinary skill in the art simply would not be motivated to modify Kawanabe's wafer holding member based on the disclosure in Sato, Lytle and Wright. Accordingly, the Office Action has not established a *prima facie* case of obviousness.

For at least the above reasons, withdrawal of the rejection of claims 11-13, 27 and 28 (and claims 29-40 as far it is applicable) under 35 U.S.C. §103 is respectfully solicited.

III. The Rejection over the Combination of Kawanabe and Kimura

The Office Action rejects claims 14-19 and 24-26 under 35 U.S.C. §103(a) over Kawanabe in view of U.S. Patent 5,331,134 to Kimura. This rejection is moot with respect to the canceled claims 14-19 and 24-26 and is respectfully traversed with respect to claims 29-40, if applicable.

The Office Action admits that Kawanabe does not disclose or suggest the maximum amount of offset displacement to be within a specified range. However, the Office Action asserts that Kimura discloses such a feature. Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to combine Kimura with Kawanabe, because such a substitute would render Kawanabe inoperative.

Kimura discloses a double-layered heater having an upper heater element layer 2 and lower heater element 2' on the upper and lower surfaces, respectively, of a flat base heater plate 1. See Fig. 2 and col. 3, lines 8-24. The double-layered heater is to provide uniform temperature distribution over the surface of the heater plate 1. See Fig. 2 and col. 1, lines 58-63. Also, Kimura's heater plate 1 is not embedded in a ceramic substrate. See Fig. 2.

Applicant respectfully submits that, while substituting Kawanabe's multiple resistors with Kimura's resistor may obtain uniform heating to Kimura's substrate, such a substitute would provide no temperature control of resistance based on a preset temperature, because Kimura's resistor is a one-piece resistor without variation in resistance. Thus, such a substitute would render Kawanabe's overcurrent prevention inoperative. Therefore, one of ordinary skill in the art would not have been motivated to make such a substitute.

In addition, Kawanabe discloses a resistor configuration that is embedded in a substrate. In contrast, Kimura discloses a resistor that is on the surface of a substrate. Therefore, one of ordinary skill in the art would not have been motivated to combine Kimura with Kawanabe, because such a combination would render Kawanabe's configuration inoperative.

In view of the above, the Office Action is engaging in impermissible hindsight reconstruction using the present application as a roadmap. One of ordinary skill in the art simply would not be motivated to modify Kawanabe's wafer holding member based on the disclosure in Kimura. Thus, the Office Action has not established a *prima facie* case of obviousness. Accordingly, withdrawal of the rejection of claims 14-19 and 24-26 (and claims 29-40 as far it is applicable) under 35 U.S.C. §103 is respectfully solicited.

IV. The Rejection over the Combination of Kawanabe, Okuda and Niori

The Office Action rejects claims 20-23 under 35 U.S.C. §103(a) over Kawanabe or U.S. Patent 5,750,958 to Okuda et al. in view of U.S. Patent 5,280,156 to Niori et al. This rejection is moot with respect to the canceled claims 20-23 and is respectfully traversed with respect to new claims 29-40, if applicable.

The Office Action admits that Kawanabe does not disclose or suggest a heater comprising a spiral wire. However, the Office Action asserts that Okuda and Niori disclose such a feature. Applicant respectfully submits that Okuda and Kawanabe, individually or in

combination, do not disclose or suggest a heat generation pattern formed in an interior of the ceramic substrate, wherein a part of the heat generation pattern is displaced on an offset level different from others of the heat generation pattern, as recited in claim 29.

Okuda discloses a plug-shaped heater 1 having a tip, a cylindrical body and two parallel resistor layers 3 and 4. See Figs. 1 and 2, and col. 6, lines 27-42. In each of the two resistors 3 and 4, no part is displaced from the remaining part of the resistors. See Figs. 1 and 2. Therefore, as far as the claimed subject matter is concerned, Okuda does not disclose anything more than Kawanabe. Thus, Okuda does not supply the subject matter lacking in Kawanabe. Accordingly, Okuda and Kawanabe, individually or in combination, do not disclose or suggest the subject matter recited in claim 29, and claims 30-40 depending therefrom.

Furthermore, Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to combine Niori with Kawanabe, because such a substitute would render Kawanabe inoperative.

Niori discloses a heat generating resistive element 3 embedded in a substrate 2 to provide homogeneity of heating. See Fig. 1; col. 2, lines 45-51; and col. 4, lines 11-17. The resistive element 3 is wound in spiral shape and is placed such that it parallels the flat surface of the substrate 2. See Fig. 1.

Applicant respectfully submits that substituting Kawanabe's heating resistors with Niori's spiral resistive element would provide no temperature control of resistance based on a preset temperature, because Niori's resistor is a one-piece resistor without variation in resistance. Thus, such a substitute would render Kawanabe's overcurrent prevention inoperative. Therefore, one of ordinary skill in the art would not have been motivated to make such a substitute.

In view of the above, the Office Action is engaging in impermissible hindsight reconstruction using the present application as a roadmap. One of ordinary skill in the art simply would not be motivated to modify a wafer holding member based on the disclosure in Niori. Thus, the Office Action has not established a *prima facie* case of obviousness.

For at least the above reasons, withdrawal of the rejection of claims 20-23 (and claims 29-40 as far it is applicable) under 35 U.S.C. §103 is respectfully solicited.

IV. Conclusion

In view of the foregoing amendments and remarks, Applicant submits that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number set forth below.

Respectfully submitted,



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JAO:GXL/gxl

Attachment:
Appendix
Request for Approval of Drawing Corrections

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